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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/672,149	09/26/2003	Selena Chan	21058/1206529-US1	6083

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EXAMINER

WILDER, CYNTHIA B

ART UNIT	PAPER NUMBER
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1637

MAIL DATE	DELIVERY MODE
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12/11/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/672,149	Applicant(s) CHAN ET AL.	
	Examiner Cynthia B. Wilder, Ph.D.	Art Unit 1637	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 October 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-34 is/are pending in the application.
- 4a) Of the above claim(s) 1-25 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 26-34 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/17/2007 has been entered. Claim 26 has been amended. Claims 1-34 are pending. Claims 1-25 are withdrawn from consideration as being drawn to a non-elected invention. Claims 26-34 are discussed in this Office action.

Previous Rejections

2. The prior art rejection under 35 USC 103(a) directed to claims 26-34 as being unpatentable over Shipwash in view of Shipway et al is withdrawn in view of Applicant's amendment of the claims.

New Ground(s) of Rejections

THE NEW GROUND(S) OF REJECTIONS WERE NECESSITATED BY APPLICANT'S AMENDMENT OF THE CLAIMS.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 26-34 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

(a) Claims 26-34 are indefinite at "electrodes adapted to create a field" because limitation is ambiguous and it cannot be determine how the electrode is "adapted" to perform the function recited in the claims. For example, it cannot be determined if Applicant is referring to the position of the electrodes on the device or some type of modification of the electrode or whether a particular type, characteristic or structure of an electrode(s) is required.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 26-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shipwash in view of Shipway et al (citation made of record in the prior Office actions) and further in view of Williams et al (2002/0039738, effective filing date April 24, 2001). Regarding claims 26 and 28, Shipwash teaches an apparatus comprising a reaction chamber a first channel in fluid communication with the reaction chamber; a second channel in fluid communication with the first channel; a multiplicity of nanoparticles affixed in the second channel and a detector coupled to the nanoparticle packed channel, wherein said detector is a Raman detector (figure 14 and paragraphs (see paragraphs 0066, 0167, 0174, 0189, 0270, 0395, 0425, Example 15).

Shipwash does not expressly teach wherein the multiplicities of nanoparticles are a plurality of cross-linked nanoparticles aggregates.

Shipway et al provides a review of nanoparticles arrays on surfaces. Shipway teaches that nanoparticles can be constructed from any charged nanoparticle and an oppositely charged "crosslinker" in an analogous way to the construction of colloid-polymer architectures. Shipway teaches that the "crosslinker" may be anything from a small molecule to another nanoparticle from a small molecule to another nanoparticle (page 26, first paragraph under the section 2.3.2 in column 1). Shipway teaches when an adsorbate on a rough metal surface is subject to Raman Scattering spectroscopy, very high enhancements over a flat surface are observed. Shipway teaches that Plasmon resonances of nanoparticles aggregates provide an even better excitation

frequency for surfaced enhanced Raman scattering. Shipway teaches that there are problems with aggregating nanoparticles in solution; however, Shipway teaches ways to stabilize colloid aggregates in solution. Shipway teaches that nanoparticles can be immobilized so their aggregation state can be carefully controlled. Shipway teaches surface enhanced Raman scattering activity is strongly dependent on the aggregation state of the particle (page 36 and 37, section 4.1.2. and Figure 18). Shipwash further teaches the use of electrodes in the operation of the device (paragraph 0529). Shipway et al also teaches the use of electrodes for electrochemical sensing (see page 41 and 42).

Shipwash in view of Shipway et al do not expressly teach wherein the electrode is adapted to create a field to guide nucleotides from the first channel into the second channel.

Williams et al teach a method and microfluidic system for detecting and sequencing a single molecule, the microfluidic system comprising at least a first energy field source having an energy field transverse to the sample stream, a second energy field source having a second energy field axial to the sample stream. Williams teach that the traverse field has a pair of electrodes and optionally, the axial field has a hydrostatic pressure differential (0159). Williams teach that the applied fields are electric fields, pressure fields and combinations thereof. Williams state that the fields are variable, thus permitting control of the motion of the nucleotides (0018). Williams teach that the system comprise a flowcell, which comprise channels for the sample

stream (0161) and further teaches how the electric field forces control movement from one channel to the next (see 0214, 0217, and 0220-0225).

Therefore, it would have been *prima facie* obvious to one of ordinary skill in the art at the time of the claimed invention to have been motivated to have applied a pair of electrodes to the device of Shipwash in view of Shipway for the benefit of providing a traverse field created by the pair of electrodes to control the motion of the nucleotides through the different channels as taught by Williams et al.

One of ordinary skill in the art at the time of the claimed invention would have been further motivated to utilize the electrodes taught by Shipwash in view of Shipway to create a traverse field for the additional benefit of increasing the ability of the device to detect and sequence the target molecules of interest.

Regarding claim 27, Shipwash teaches the apparatus of claim 26, wherein the apparatus is capable of detecting single nucleotide (0254 and 0255).

Regarding claim 29 and 30, Shipwash teaches the apparatus of claim 26, wherein the first channel is a microfluidic channel and the second channel is a nanochannel or microchannel (see figure 14 and paragraph 0210 and 0425).

Regarding claim 31 and 32, Shipway teaches wherein the aggregates comprise at least 2 to 4 nanoparticles (see Figure 18 and legend).

Regarding claim 33, Shipway teaches wherein the nanoparticles comprising the aggregates are silver and are about 35 nm in diameter (see page 37, col. 1, first full paragraph and Figure 18).

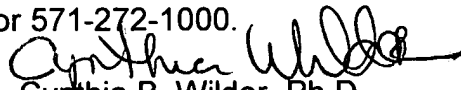
Regarding claim 34, Shipwash teaches the apparatus of claim 26, wherein the plurality of cross-linked nanoparticles affixed within the second channel are throughout a cross sectional area of the second channel and the Raman detector is adapted to detect said Raman signal (Figure 14).

Conclusion

8. No claims are allowed. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cynthia B. Wilder, Ph.D. whose telephone number is (571) 272-0791. The examiner can normally be reached on a flexible schedule.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gary Benzion can be reached on (571) 272-0782. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


Cynthia B. Wilder, Ph.D.
Patent Examiner
Art Unit 1637

12/4/2007